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Identifying Psychosocial and Social Correlates of Sexually Transmitted Diseases Among Black Female Teenagers

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Abstract

Background—Black teenagers have relatively high rates of sexually transmitted diseases (STDs), and recent research suggests the role of contextual factors, as well as risk behaviors. We explore the role of 4 categories of risk and protective factors on having a biologically confirmed STD among black, female teenagers.

Methods—Black teenage girls (14–19 years old) accessing services at a publicly funded family planning clinic provided a urine specimen for STD testing and completed an audio computer-assisted self-interview that assessed the following: risk behaviors, relationship characteristics, social factors, and psychosocial factors. We examined bivariate associations between each risk and protective factor and having gonorrhea and/or chlamydia, as well as multivariate logistic regression among 339 black female teenagers.

Results—More than one-fourth (26.5%) of participants had either gonorrhea and/or chlamydia. In multivariate analyses, having initiated sex before age 15 (adjusted odds ratio [aOR], 1.87) and having concurrent sex partners in the past 6 months (aOR, 1.55) were positively associated with having an STD. Living with her father (aOR, 0.44), believing that an STD is the worst thing that could happen (aOR, 0.50), and believing she would feel dirty and embarrassed about an STD (aOR, 0.44) were negatively associated with having an STD.

Conclusions—Social factors and attitudes toward STDs and select risk behaviors were associated with the risk for STDs, suggesting the need for interventions that address more distal factors. Future studies should investigate how such factors influence safer sexual behaviors and the risk for STDs among black female teenagers.

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Approximately 25% of teenage girls (14–19 years old) in the United States have 1 of 5 common sexually transmitted diseases (STDs), and rates of infection are higher among black teenagers than among teenagers from other racial and ethnic groups overall and in the southern United States.[1–3] Although gonorrhea and chlamydia rates decreased among all 15- to 19-year-old girls from 2011 to 2012, in 2012, 15- to 19-year-old black girls had a rate of chlamydia approximately 5 times higher and a rate of gonorrhea approximately 15 times higher than did 15- to 19-year-old white girls.[2] In the South, in 2011, 15- to 19-year-old black girls had a rate of chlamydia approximately 5 times higher and a rate of gonorrhea approximately 11 times higher than did 15- to 19-year-old white girls.[4] Understanding the array of factors that increase black teenagers' risk for STDs is critical for developing effective interventions tailored to this population.

Efforts to identify characteristics associated with STDs among adolescents (typically 15–20 years old) require considering factors at multiple levels of the socioecologic model, including factors at the individual, relationship, and social levels.[5,6] A large body of literature focuses on demographic factors and risk behaviors, at the individual level, and partner characteristics, at the relationship level. Demographic characteristics (e.g., younger age and not being in school), individual risk behaviors (e.g., lower age at sexual initiation, higher number of partners, noncondom use, history of STDs, and drug use), and select partner characteristics (e.g., having a new sex partner, having concurrent sex partners, age disparity between partners, and having a casual partner) contribute to STD acquisition.[7–16]

Although these findings are valuable, more recent studies suggest that a fuller understanding of STD risk requires an assessment of additional factors at the relationship level and factors at the social level. Recent studies suggest the importance of such contextual factors, given that individual sexual risk behaviors do not fully explain racial differences in STDs.[17–19] For example, authors of one study suggested that the finding that a greater number of partner's sexual risk characteristics (e.g., had concurrent sex partners) were associated with having an STD among black participants and a greater number of a participant's own risk characteristics (e.g., anal sex) were associated with having an STD among white participants indicated that sexual networks within the black community contribute to high rates of STDs.[19] Other contextual factors that may play a role include factors at the social level, such as lower level of mother's education, not living in a 2-parent household, and welfare receipt.[16,20] In addition, a few studies suggest the importance of individual psychosocial factors, such as contraceptive self-efficacy or fear of condom negotiation.[14,21]

Given the potential importance of factors at multiple levels, our purpose is to explore associations between individual risk, psychosocial factors, partner risk, social factors and prevalent STDs (i.e., chlamydia and gonorrhea) among 14- to 19-year-old black girls in a southeastern city (Atlanta, GA) with high rates of STDs.

MATERIALS AND METHODS

Data come from a cross-sectional survey conducted from April to September 2012 with 350 black female teenagers (14–19 years old) recruited from a publically funded teen clinic in Atlanta, GA. Inclusion criteria were as follows: self-identified black/African American, born

in the United States, 14 to 19 years old, had vaginal sex in the past 6 months, and sought services at the clinic on the day they were recruited for the study. Study staff approached each patient, after she checked into the clinic, to explain the study. Teenagers who were eligible and gave informed consent (17–19 years old) or assent (14–16 years old) provided a urine specimen for STD testing and completed an audio computer-assisted self-interview (ACASI) that addressed risk and protective factors of interest (see "Measures"). Survey administration averaged approximately 30minutes. Participants were compensated $20. Emory University and the US Centers for Disease Control and Prevention granted institutional review board approval (including a waiver of parental consent) for this study, which was funded through a Cooperative Agreement with the US Centers for Disease Control and Prevention.

Measures

The outcome of interest was having an STD on the day of the survey. Urine samples were tested for gonorrhea and chlamydia (GenProbe Nucleic Acid Amplification). We considered participants whose urine tested positive for either gonorrhea or chlamydia as having an STD.

We considered 4 categories of risk and protective factors at the individual, relationship, and social levels: risk behaviors, perceptions of STDs, relationship with most recent male partner, and social factors (Table 1). The survey assessed *individual risk behaviors*: initiated vaginal sex by age 15 years, ever forced to have sex (oral, vaginal, or anal), lifetime number of sex partners (1–2, 3–6, 7 plus), used drugs (e.g., marijuana and cocaine) in the past month, and condom use in the past month (did not have sex in the past month, never or sometimes used condoms, always used condoms).We also asked whether a health care provider ever told the participant that she had an STD. Also at the individual level, psychosocial variables focused on *perceptions of STDs*: worried about STDs in the past 6 months, perceived burden of having an STD in the next 6 months (able to deal with it vs. worst thing), and agreed or strongly agreed she would feel dirty and/or be embarrassed if she had an STD in the next 6 months. We characterized a participant's *relationship with her most recent male partner*: length of sexual relationship (0–3 months, 4–11 months, ≥12 months); whether she considered him a serious partner or boyfriend, frequency of sex (once or twice only, less than monthly, at least once a month), and whether she was still having sex with him. We included 2 measures of sexual concurrency: whether she had multiple or concurrent sex partners in the past 6 months (1 partner, serial partners, concurrent partners) and whether she was certain he did not have concurrent sex partners (vs. being sure he had concurrent partners, thinking he had other partners, or thinking he did not have other partners). To explore the role of *social factors*, we assessed whether any household member received public assistance (e.g., food stamps and school lunch), her mother completed high school/GED, she lived with her father (and mother or other adults), and she had a paid job in the past 6 months. We included age (14–16 vs. 17–19 years old) in this category, although it is not strictly speaking a social factor.

Analyses

First, we assessed bivariate associations between each potential risk factor and having an STD. We began our multivariate analyses by constructing a logistic regression model for

each of the 4 categories of potential risk factors. Each of the 4 models included factors within that particular category with a *P* value less than 0.10 from bivariate analyses. Next we entered variables with *P* values less than 0.10 from the 4 category-specific models into a single multivariate model and retained those with a *P* value level less than 0.05 to arrive at a final model. Assessment of variance inflation factors suggested that multicollinearity was not an issue (i.e., variance inflation factor values all <2.0).

RESULTS

Of 698 young women approached, 525 were screened, 374 were eligible, and 350 consented to and participated in the study. The most common reason for being ineligible was not having had vaginal sex in the past 6 months (n = 118). We excluded 3 participants because they did not have STD test results or their results were indeterminate. To rule out STDs that participants knew about but had not received treatment for, we excluded 8 participants who had ever been told by a provider that they had an STD and reported not receiving treatment the last time they were told that they had an STD.

Characteristics of the 339 participants in our analytic sample generally reflected the low-income population served by the clinic (Table 1). Most were enrolled in school (92.3%; data not shown), and few had paid jobs (28.3%). Only 20.4% lived with their father (16.2% lived with both parents and 4.2% lived with their father and other adults), and most (76.7%) lived in a household that received public assistance. Most (69.3%) initiated sex by age 15, and 42.5% reported a history of STDs. Sixty-six percent had at least 3 male sex partners in their lifetime, and half reported having only 1 male sex partner in the past 6 months. More than one-quarter (26.5%) of participants were positive for an STD: 21.2% had only chlamydia, 2.7% had only gonorrhea, and 2.7% had both chlamydia and gonorrhea. Sixty-one percent of participants with an STD reported on the ACASI that they did not think they had an STD (data not shown).

In bivariate analyses, χ^2 test statistics were significant with a *P* value of 0.10 or less for at least 3 risk/protective factors in each group (Table 1). Notably, among sexual risk factors, ever being forced to have sex and condom use in the past month were not associated with STDs. Those who initiated sex earlier, those who had more lifetime partners, and those who had a history of STDs were more likely to have an STD. *P* values for all 3 of the measures of perceptions of STDs were 0.10 or less. For example, 39.2% of the participants who thought they could “deal” with an STD had an STD, but only 22.7% of those who believed an STD would be the worst thing that could happen had an STD. Participants in relationships 0 to 3 or 4 to 11 months, those who did not think of their male partners as a serious partner, and where one or both partners had concurrent sexual partners were more likely to have an STD. Among the social factors, younger girls and those without jobs were more likely to have STDs than older girls and those with jobs. Only 17.6% of the 68 participants who lived with their fathers (and mother or other adult) had an STD (vs. 28.7% of those who did not live with their fathers).

Results of the 4 category-specific models identified a smaller set of correlates (Table 2). Among sexual risk variables, only initiating sex by age 15 years was significant at $P \leq 0.10$

(adjusted odds ratio [aOR], 1.74; confidence interval [CI], 0.96–3. 17). Among STD perceptions, only believing that having an STD would be the "worst thing" had a *P* value less than or equal to 0.10; participants who believed having an STD was the worst thing were approximately half as likely (aOR, 0.52; CI, 0.30–0.91) to have an STD as participants who believed they could "deal with" an STD. Two relationship characteristics were significant at $P \leq 0.10$. Participants in new relationships (i.e., 0–3 months) were 1.77 times (CI, 0.89–3.52) more likely to have an STD than those in relationships that had been ongoing for at least a year. Having concurrent relationships was associated with the risk for STDs; participants with concurrent sexual partners were 1.62 times more likely (CI, 1.10–2.38) to have an STD than participants with only 1 partner in the past 6 months. Participants who lived with a father were approximately half as likely (aOR, 0.52; CI, 0.27–1.03) to have an STD as participants who did not live with a father (column 3).

In our final multivariate model, having initiated sex before age 15 years (aOR, 1.87; CI, 1.02–3.44) and having concurrent partners in the past 6 months (aOR, 1.55; CI, 1.05–2.29) were significantly associated with STDs. Two STD perceptions were statistically significant at $P \leq 0.05$; teenagers who believed that an STD is the worst thing that could happen (aOR, 0.50; CI, 0.28–0.90) and teenagers who would feel both dirty and embarrassed having an STD (aOR, 0.44; CI, 0.19–0.99) were less likely to have an STD. Although participants in a newer sexual relationship with the most recent partner were more likely to have an STD, relationship length was not significant at the $P \leq 0.05$ level. Living with her father remained protective of STDs (aOR, 0.44; CI, 0.22–0.90). The −2 log likelihood is 353.26, and the Nagelkerke R^2 for this model is 0.131 (approximately 13% of the variance explained).

DISCUSSION

Nearly 27% (26.5%) of the black female teenage participants had chlamydia and/or gonorrhea. The prevalence of STDs in our study is in line with other samples of black teenagers from the region. For example, in a longitudinal study of 14- to 20-year-old black female participants recruited from 3 reproductive health clinics in Atlanta from 2005 to 2007, 20% were positive for chlamydia and/or gonorrhea at baseline and 40% with an STD at baseline had a repeat infection during the study's follow-up period.[10] The prevalence of STDs in our sample and among black teenage girls (4127 per 100,000 black teenage girls) and black teenage boys (299 per 100,000 black teenage boys) in Fulton county (where Atlanta is located) suggest high STD risk in the sexual networks of black teenagers in Atlanta.[22]

Although some risk behaviors (age at sexual initiation, having concurrent sex partners) were associated with STDs in our final model, others were not. This finding is consistent with other studies demonstrating that individual risk behaviors alone do not fully explain STD risk among black teenagers and young adults living in areas with high STD prevalence.[18–20] That condom use was not associated with STDs may stem from issues around the validity of self-report, our measure of condom use (consistency in the past month), and patterns of condom use within relationships.[22] Condom use declines as relationships progress and may vary day-to-day as feelings about one's partner and one's relationship with that partner change.[23–25] Given the age and living arrangements of our participants (i.e., none lived with

partners), they did not have sex frequently in the past month (only 16.9% reported having sex with their most recent partner more than once a week). Although some were in newer sexual relationships and always used condoms in the past month, they may not have used condoms consistently in prior months.

Unlike psychosocial measures assessed in other studies (e.g., fear of condom negotiation), our measures focused on STDs. Despite the stigmatizing nature of the attitudes we assessed, girls who held negative attitudes were less likely to have STDs. It is unclear, however, how these negative perceptions motivate girls to adopt protective behaviors. Participants who held negative beliefs may have used behavioral strategies that we did not assess, including having conversations with potential partners to better assess their risk for STDs before establishing a sexual relationship, going together with a male sex partner for STD testing and sharing results, or explicitly making and keeping an agreement to be monogamous. These negative perceptions suggest that the black teenagers in our sample had strong concerns about STDs, concerns that may have led some to take steps to avoid STDs. Conversely, the same strong concerns may also translate into greater denial for STD risk, a poor strategy for reducing STDs in the face of high rates of STDs in the geographic area.

Living with a father (and mother or other adult) was associated with a lower risk for STDs. This may not be a function of socioeconomic status, as other arguably strong measures of socioeconomic status (i.e., mother's education and household welfare receipt) were not associated with having an STD. Having a father in the household may be a proxy for more supportive parent-child relationships; 2 parents may find it easier to offer supervision, communication, and/or support to help teenagers safely navigate sexual relationships. They may provide access to social networks in which young people (and thus potential partners) are at reduced risk for STDs, or may be able to better communicate about and support safer behaviors. Research on delayed sexual initiation and abstinence lends support to the notion that better communication and supervision within 2 parent families may help teens safely navigate sexual relationships.[26,27]

Our study has limitations. Cross-sectional data from black female teenagers seeking care may not be representative of STD risk among all sexually active black female teenagers. However, our sample represents a group in urgent need of prevention and control services. In any cross-sectional study, there is the potential for the temporal sequencing to be problematic as an undetermined proportion of STDs detected may have been prevalent for several months, despite our attempt to rule out STDs about which participants already knew but did not receive treatment. Finally, participants self-reported behavioral data were subjective and may have been prone to recall and social desirability biases. The strengths of our study include ACASI administration of the survey to increase confidentiality and comfort in disclosing sensitive topics and biological confirmation of STD results.[28]

Implications

In addition to select individual and network risk factors, clinicians and public health practitioners should also address relationship factors, past partners, STD stigma, and social support. Clinicians should help patients understand how past partners and sexual networks might place them at risk for STDs. Furthermore, more supportive and ongoing counseling

for adopting and using a range of behavioral strategies may help motivate teens to adopt behaviors to reduce their risk. Our findings suggest the need for interventions to address factors at the social level. For example, our findings suggest that social support from both parents may be important for helping teenagers navigate romantic and sexual relationships. Teenagers may need multiple types of support for delaying initiation of sex, increasing communication with partners about STDs, getting tested, or using condoms.

Our research also suggests the need for additional research to identify and understand how a more complete set of individual, relationship, and social factors are associated with and influence STD risk among black teenagers. Analyses may need to consider a more complete set of factors, including those that shape sexual networks and social support available for safer behaviors. Also, as suggested in some thinking about socioecologic models, analyses might consider whether and how factors at various levels that operate simultaneously may interact to influence behavior and health outcomes.[5] Finally, longitudinal data are needed to better understand causality. Given the high rate of STDs in our sample and among black teens in general, risk reduction programs and research are urgently needed.

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TABLE 1

Sample Distribution and Percentage of Participants With STDs for Select Risk and Protective Factors: 14- to 19-Year-Old Black Female Teenagers Accessing Reproductive Health Services at a Publically Funded Clinic in Atlanta, GA

	Sample Distribution, % (n)	Participants with an STD, % (n)	*P*-Value (1-Sided χ^2)
Had an STD			
No	73.5 (249)		
Yes	26.5 (90)		
Risk behaviors			
Initiated vaginal sex by age 15 y			
No	30.7 (104)	18.3 (19)	0.01
Yes	69.3 (235)	30.2 (71)	
Ever forced to have sex (oral, anal, vaginal)			
No	86.7 (294)	25.5 (75)	0.18
Yes	13.3 (45)	33.3 (15)	
Lifetime no. sex partners			
1–2	34.5 (117)	21.4 (25)	
3–6	43.4 (147)	27.9 (41)	0.02
≥7	22.1 (75)	32.0 (24)	
Used drugs, past month			
No	72.3 (245)	25.3 (62)	0.24
Yes	27.7 (94)	29.8 (28)	
Condom use, past month			
Did not have sex, past month	24.2 (82)	24.4 (20)	
Never or sometimes	60.5 (205)	27.8 (57)	0.29
Always used condoms	15.3 (52)	25.0 (13)	
Provider ever told her she had STD			
No	57.5 (195)	23.6 (46)	0.10
Yes	42.5 (144)	30.6 (44)	
Perceptions of STDs			
Worry about STDs, past 6 mo			
No	61.4 (208)	23.6 (49)	0.07
Yes	38.6 (131)	31.3 (41)	
Perceived burden of having an STD, next 6 mo			
Could deal with it	23.3 (79)	39.2 (31)	0.003
Worst that could happen	76.7 (260)	22.7 (59)	
Dirty and/or embarrassed if had an STD, next 6 mo			
Disagree with both	9.7 (33)	39.4 (13)	0.02
Disagree with one	13.6 (46)	32.6 (15)	
Agree with both	76.7 (260)	23.8 (62)	
Relationship with most recent male partner			
Length of sexual relationship			

	Sample Distribution, % (n)	Participants with an STD, % (n)	*P*-Value (1-Sided χ^2)
0–3 mo	49.6 (168)	29.2 (49)	
4–11 mo	25.6 (88)	28.4 (25)	0.07
≥12 mo	24.4 (83)	19.3 (16)	
Serious partner or boyfriend			
No	43.7 (148)	31.8 (47)	0.04
Yes	56.3 (191)	22.5 (43)	
Frequency of sex, most recent partner			
Once or twice only	23.7 (80)	32.5 (26)	0.10
Less than monthly	27.2 (92)	25.0 (23)	
At least once a month	49.1 (166)	24.1 (40)	
Still having sex			
No	22.8 (77)	26.0 (20)	0.53
Yes	77.2 (261)	26.4 (69)	
Multiple or concurrent sex partners, past 6 mo			
1 partner	50.4 (171)	21.6 (37)	
Serial, multiple partners	38.3 (130)	27.7 (36)	0.004
Concurrent, multiple partners	11.2 (38)	44.7 (17)	
Certain he did not have concurrent sex partners			
Sure he did not have	34.9 (118)	21.2 (25)	0.07
Sure he had or uncertain	64.9 (220)	29.1 (64)	
Social factors and age			
Household member received public assistance			
No or don't know	23.3 (79)	30.4 (24)	0.23
Yes	76.7 (260)	25.4 (66)	
Mother, completed high school/general equivalency diploma			
No and don't know	31.6 (107)	29.9 (32)	0.21
Yes	68.4 (232)	25.0 (58)	
Lived with father (and mother/other adults)			
No	79.6 (265)	28.8 (76)	0.04
Yes	20.4 (68)	17.6 (12)	
Had paid job, past 6 mo			
No	71.7 (243)	28.8 (70)	0.09
Yes (Job Corp, part-time, full-time, sporadic)	28.3 (96)	20.8 (20)	
Age, y			
14–16	35.4 (120)	32.5 (39)	0.05
17–19	64.6 (219)	23.3 (51)	

TABLE 2

Multivariate Associations Between Select Factors and Having an STD: 14- to 19-Year-Old Black Female Teenagers Accessing Reproductive Health Services at a Publically Funded Clinic in Atlanta, GA

Category-Specific Models *		Final Model (Nagelkerke R^2 = 0.131), OR (95%CI)†
	OR (95% CI)	
Risk Behaviors (Nagelkerke R^2 = 0.035)		
Initiated vaginal sex by age 15 y		
No	1.0 (referent)	1.0 (referent)
Yes	1.74 (0.96–3.17)‡	1.87 (1.02–3.44)§
Lifetime no. sex partners		
1–2	1.0 (referent)	
3–6	1.19 (0.66–2.16)	
≥7	1.33 (0.66–2.69)	
Provider ever told her she had STD		
No	1.0 (referent)	
Yes	1.27 (0.77–2.11)	
Perceptions of STDs (Nagelkerke R^2 = 0.052)		
Worry about STDs, past 6 mo		
No	1.0 (referent)	
Yes	1.43 (0.87–2.37)	
Perceived burden of having an STD, next 6 mo		
Could deal with it	1.0 (referent)	1.0 (referent)
Worst that could happen	0.52 (0.30–0.91)§	0.50 (0.28–0.90)§
Dirty and/or embarrassed if had an STD, next 6 mo		
Disagree with both	1.00 (referent)	1.00 (referent)
Disagree with one	0.75 (0.29–1.93)	0.64 (0.23–1.74)
Agree with both	0.54 (0.25–1.19)	0.44 (0.19–0.99)§
Relationship with most recent partner (Nagelkerke R^2 = 0.059)		
Length of sexual relationship		
0–3 mo	1.77 (0.89–3.52)‡	1.78 (0.88–3.60)
4–11 mo	1.61 (0.77–3.38)	1.69 (0.79–3.62)
≥12 mo	1.0 (referent)	1.0 (referent)
Serious partner or boyfriend		
No	1.0 (referent)	
Yes	0.75 (0.44–1.25)	
Multiple or concurrent sex partners, past 6 mo		
1 partner	1.0 (referent)	
Serial, multiple partners	1.18 (0.66–2.09)	
Concurrent, multiple partners	1.62 (1.10–2.38)§	
Certain he did not have concurrent sex partners		

Category-Specific Models *		Final Model (Nagelkerke R^2 = 0.131), OR (95%CI)†
	OR (95% CI)	
Sure he did not have	1.0 (referent)	
Sure he had or uncertain	1.25 (0.70–2.23)	
Social factors and age (Nagelkerke R^2 = 0.035)		
Lived with father (and mother/other adults)		
No	1.0 (referent)	1.0 (referent)
Yes	0.52 (0.27–1.03)‡	0.44 (0.22–0.90)§
Had paid job, past 6 mo		
No	1.0 (referent)	
Yes (Job Corp, part-time, full-time, sporadic)	0.72 (0.40–1.30)	
Age, y		
14–16	1.0 (referent)	
17–19	0.67 (0.41–1.12)	

*Each of the 4 category-specific models includes variables from that category that were significant at $P \leq 0.10$ in bivariate analyses and were adjusted for each other variable in the category.

†Adjusted for each other variable for which results are listed.

‡$P \leq 0.10$.

§$P \leq 0.05$.

OR indicates odds ratio.